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PAPERS

IN

CHEMISTRY.

The SILVER MEDAL *of the Society was this Session voted to Mr.* WILLIAM ANDERSON, *of his Majesty's Dock-Yard, Portsmouth, for a Method of painting Linen Cloth in Oil Colours, to be more pliant, durable, and longer impervious to Water, than in the usual Mode.*

The following Communications were received from him, and Specimens of the Cloth and Colours are preserved in the Society's Repository.

SIR,

I BEG leave to lay before the Society of Arts, &c. the following improvements and observations, which I hope will be of service to the public.

Having never heard or read of any method being discovered to prevent paint when laid on canvas from hardening to such a degree as to crack and eventually to break the canvas, and render it unserviceable in a short time; and having been an eye-witness for many years of much canvas perishing for want of such discovery in the immense quantities painted for covering seamen's hammocks, and for other uses on board his Majesty's ships; I long had it under consideration to find out such an ingredient as, when mixed with paint, would preserve the canvas and paint laid thereon from the damages above mentioned, and after experiments for a considerable time, I have discovered such an article, and made trial of it with effect above three years.

The canvas I have painted has been submitted to the inspection of the Navy Board, who are so perfectly satisfied with my new method, that general directions are now given to paint all canvas in his Majesty's dock-yards in this manner, which, in addition to the advantages I have before mentioned, actually saves an expense of one guinea in every hundred square yards of canvas so painted, as I have fully stated to them. The ingredient I use is not only serviceable for ships' canvas, but also for canvas designed for paintings, for floor cloths, and for painted coverings within and without doors. I have no doubt of it being applied to many other purposes I am yet unacquainted with; as from actual trials of near four years, I can vouch for its being a preservative to red, yellow, and black paints, when ground in oil and put in casks. When the paints were examined at the expiration of such time, they discovered no improper hardness; but when laid on the work with a brush, they dried in a remarkable manner, without addition of any of the usual drying articles. I still preserve some of these paints for future trials, and I believe this plan of preserving colours will be of essential use to colourmen, and other persons who purchase colours for exportation. The ingredient I use is perfectly simple, being a solution of yellow soap; and the composition for painting is made in the following manner:

To one pound of soap I add six pints of water in a vessel over the fire; in a few minutes after the boiling of the water the soap will dissolve; whilst hot it is to be mixed with oil paint, prepared as hereafter directed, and is then fit for immediate use. The above quantity of soap solution will be sufficient to mix with one hundred weight of paint. The first coat to be laid upon the canvas is to be intirely of this composition, without first wetting the canvas in the usual way. A very small proportion of it, or none, is necessary in the second coat; and the third coat should be of oil paint alone.

The method heretofore practised in his Majesty's dock-yards for painting canvas, was as follows: The canvas was first wet with water, then primed with Spanish brown; a second coat given it of a chocolate colour, made from Spanish brown and black paint; and, lastly, finished with black. This mode is destructive, and more expensive than mine, in the proportion before mentioned. *In my method,* to ninety-six pounds of English ochre ground in boiled oil, I add sixteen pounds of black paint, being one-sixth in proportion of the ochre; this, when mixed, forms an indifferent black. The solution made of one pound of soap and six pints of water, is to be added to this paint, and well united therewith; and without the canvas being previously wet, this composition is to be laid upon the canvas as stiff as can conveniently be done with the brush, and this first coat will form a tolerably smooth surface. The second coat is to be formed of the same proportion of English ochre and black, without any soap solution; and the third or finishing coat, to be done with black paint as usual.

I am, Sir,

Your obedient humble Servant,

Wm. ANDERSON,
Master Painter of H. M. Dock Yard,
at Portsmouth.

Portsea, Oct. 31*st*, 1806.

SIR,

Agreeably to the request in your letter, I have inclosed certificates relative to my new method of painting canvas; and I take the liberty of informing you of a method of obtaining from painted canvas, unserviceable, the whole of the colour laid thereon, and to do it at a very small expense. This I discovered since I last wrote to you, and I believe it will be of considerable advantage to government, who, for want of such a thought, have buried and burnt immense quantities of ships' hammock cloths, when found unserviceable, to prevent embezzlement from taking place. I suggested the idea to N. Diddems, Esq. builder of Portsmouth yard, who communicated it to the Honourable George Grey, Commissioner. I obtained leave to make an experiment, which I repeated thrice, and found that from one ton of painted canvas, unserviceable, I obtained, upon an average, four hundred weight of dry colour, in value to government nine pounds six shillings; the expense of the process not exceeding six shillings.

This I effected by calcination, raking aside the ashes and sprinkling them with water, to prevent loss of paint through excess of heat. By passing the calcined matter through a fine sieve, it is perfectly prepared for grinding; it grinds well, possesses a good body for covering with, and dries well with a good gloss. Its increase of bulk, in comparison with common colour of equal weight, gives it the advantage of covering more work. The colours yielded by the calcination of different coloured canvas are as follow, viz. Canvas which has been painted with black paint only, produces a black colour. Canvas finished black, but which has had a previous red or yellow ground, will produce a dark chocolate colour. Canvas painted lead colour, will yield a good dark lead colour.

I am, Sir,

Your obedient humble Servant,

Wm. ANDERSON.

Portsea, March 25, 1807.

To C. Taylor, M.D. Sec.

Certificates, dated March, 1807, were received from the following persons, viz.

A. Stow, lieutenant and commander of the gun brig Steady, stating, that in the preceding month of October he had received on board his ship a set of hammock cloths, painted after the method invented by Mr. William Anderson, which had been constantly in use since the time above mentioned, and appeared fully to answer the end proposed, of rendering the canvas soft and pliable, of preventing its cracking, or the paint peeling off, and which in the old method had been a subject of much complaint.

JOHN PRIDY, lieutenant and commander of the Gladiator, and formerly commander of the Dapper, on which latter ship a set of hammock cloths, painted after Mr. Anderson's method, appeared fully to answer the end proposed.

P. F. WYATT, oil and colourman, Portsea, stating that he had seen canvas painted after Mr. Anderson's new method, which, after a trial of sixteen months, remained perfectly soft and pliable, the paint by no means cracking or peeling off, and that the gloss was retained, though it had been exposed to all weathers. He further added, that he had seen the paint prepared by him from old painted canvas found unserviceable, and had worked and painted therewith ; that it was, in his judgment, very good, and would answer either on canvas, wood, or iron.

Ns. DIDDEMS, master shipwright, Portsmouth dockyard, stating that Mr. Anderson had proposed to him to obtain, by calcination, from old unserviceable painted canvas, the paint which had been laid thereon; that such experiment was made, and four hundred weight of dry serviceable paint prepared from one ton of such canvas; that he had seen it when ground in oil and laid on work, when it appeared to possess all the properties of good paint, and had therefore been recommended by him to the Navy Board.

SIR,

IN answer to your letter of the 25th of April, in which you informed me that the Committee were desirous that I should furnish them with a sample of canvas painted in the old method, and another on my improved plan, I trust that I shall be able fully to comply with their request. In the first place, I have sent a small sample of the residuum of the burnt canvas, fit for grinding in oil for paint, also a piece of canvas painted therewith, marked No. 1; another piece painted after the old method, marked No. 2; another piece painted according to my process, marked No. 3; and, lastly, a piece finished intirely with the new composition, marked No. 4; each sample having received three coats of paint. Upon examining No. 2, you will find it becoming from time to time more stubborn, in consequence of the paint hardening; and when a small ridge is formed in it, by pressing it between the finger and thumb, it will soon discover that it is subject to crack, and by this means permitting the wet to enter it, will soon rot the canvas.

The space of time proper between laying on the new preparation and the second coat, ought to be one entire day; but if saving time is an object, the second coat may be put on the day following the first; for if the canvas is placed in an advantageous situation for drying, the composition will dry or harden so as not to rub off.

Canvas finished intirely with the composition, leaving it to dry one day between each coat, will not stick together if laid in quantities, as you will find by making experiments on the sample No. 4.

Since the Navy Board have given directions for ships' canvas to be painted according to my method, I find, upon calculation, that I have painted upwards of twenty thousand yards since November last, a great part of which has not been hung up for painting and drying more than one week, as no more time could be allowed me, in consequence of ships sailing. My plan was therefore to lay on the composition the first day, to coat it the second day, and leaving one intermediate day, to finish it on the fourth. Three days were then allowed it to dry and harden, and when afterwards taken down and folded together in cloths, containing sixty or seventy yards, they did not stick together.

Having no means of giving information to persons concerned in grinding colours, so well as through the medium of the Society of Arts, &c. I beg leave further to relate how I have, for the last three years, saved the labour of three men out of four in grinding colours with the common mills employed for that purpose. One mill has ever been considered sufficient for a man to turn, whereas one man can now, with perfect ease, turn four mills; this is effected by placing two mills on each side of the winch, so close as only to leave room for the fly wheel to play between them. The spindles of each on either side are locked together by a small iron collar, with a pin passing through it. The distance of the mills thus paired from each, in order for the man's standing between them to turn, is two feet six inches. The distance of the arms of the winch screwed on the end of the spindles on either side, is two feet two inches; the length of the arm is one foot six inches from the spindles to the bar across which the man clasps in order to turn.

Fly wheels at the extremity are impediments. Necessity was truly the mother of invention to me in this case, as I had great demand for paint, and I was not allowed men sufficient for the work in the common way.

Persons will scarcely believe, without seeing the experiment, the ease with which they turn. If a little extraordinary motion is first given them, and they are then left alone, they will continue to go round sixteen times; so that a man with one hand may turn them.

I am, Sir,

Your obedient humble servant,

Wm. ANDERSON.

Portsea, May 6, 1807.

To C. Taylor, M. D. Sec.

SIR,

I have stated to the Admiralty Board the several improvements made by me in paint work, and in consequence thereof they have desired the principal officers of our yard to report to them on their merits. The officers, who have for more than twelve months past daily had the execution of them under their inspection, have recommended the same in stronger terms, and the advantages thereof, to the Lords Commissioners, beyond my statement. I have inclosed to you a certificate relative to the ship Hibernia, which arrived here the 12th of May last, and for which vessel I painted a set of hammock cloths, containing thirteen hundred yards of canvas, in June 1806, after my new method.

I am, Sir,

Your obedient humble servant,

Wm. ANDERSON.

Portsmouth, Nov. 27, 1807.

To C. Taylor, M. D. Sec.

The foregoing letter was accompanied with a certificate from Captain Hicks, and William Trounsell, carpenter of his Majesty's ship Hibernia, stating, that the hammock cloths on board the said vessel were painted in June 1806, after Mr. William Anderson's method; that they were pliable, and did not crack, nor the paint peel off, and were, in their opinion, preferable to those painted in the common way.

SIR,

I BEG leave to trouble you with a further certificate relative to the merits of my method of painting canvas.

I have also discovered a lead coloured paint, highly advantageous for all iron-work exposed to the weather, and preferable to that commonly made from white lead and black. The preparation is as follows:

Process for Lead Coloured Paint on Iron.

I take a fire shovel, and put a small quantity of common litharge thereon, and place it over the fire. I then take a small portion of flour of brimstone between my fingers, and scatter it over the litharge, when the same is sufficiently warm to give light to it. It is instantly converted to a blackish colour, which, when ground in oil, makes a good dark lead colour. It dries quick, gets remarkably hard, and resists the weather beyond any other lead colour. It will be extremely useful in the Ordnance department for painting guns.

I am, Sir,
Your humble servant,
WM. ANDERSON.

Portsmouth Dock Yard,
Feb. 26, 1808.

To C. TAYLOR, M. D. SEC.

The

This letter was accompanied with a certificate from J. B. Harrison, lieutenant and commander of his Majesty's brig Red-Breast, dated Feb. 26, 1808, stating, that the hammock cloths on board the said vessel were painted by Mr. Anderson, in April 1807, and had since that time been constantly in wear, and exposed to the weather day and night; that owing to this new mode they had been preserved supple, without cracking, and that the paint adhered to them in a far superior manner to the former mode of painting.

FIVE GUINEAS *were this Session voted to Mr.* THOMAS SADDINGTON, *No. 73, Lower Thames Street, for a Cheap Method of Preserving Fruit without Sugar, for House Use or Sea Stores. The following Communications were received from him, and Bottles of Fruits thus Preserved are placed in the Society's Repository.*

SIR,

I SHALL be much obliged to you to lay before the Society of Arts, &c. the inclosed communication, and a box containing the following fruits in bottles, preserved without sugar, namely, apricots, gooseberries, currants, raspberries, cherries, Orleans plums, egg plums, green-gages, damsons, and Siberian crabs. I have also sent some fresh English rhubarb plant, preserved in a similar manner. The same mode is applicable to other English fruits, as cranberries, barberries, and many more. This manner of preserving fruit will be found particularly useful on ship-board for sea stores, as the fruit is not likely to be injured by the motion of the ship, when the bottles are laid down on their sides, and the corks kept moist by the liquor, but on the contrary will keep well even in hot climates.

The cheapness of the process will render it deserving of the attention of all families from the highest to the lowest ranks of society. If the instructions I have sent are well attended to, I have no doubt that whoever tries my method will find it to answer his expectation.

I am, Sir,

Your most obedient humble Servant,

THOMAS SADDINGTON.

London, Jan. 8, 1808.

To C. Taylor, M. D. Sec.

A new Method to Preserve various Sorts of English Garden and Orchard Fruits, without Sugar.

Gentlemen,

The general utility, as well as luxurious benefit, arising from the fruit produced by our gardens and orchards, is well known and acknowledged at the festive board of every family; nor is this utility and benefit less manifested by a desire of many persons to preserve them for culinary purposes, in the more unbountiful season of the year; and I am well persuaded that this commendable desire would be greatly extended in most families, was it not attended with so much expense as is generally the case by preserving fruit in the common mode with sugar, that article chiefly constituting the basis by which it is effected. In addition to the expense of sugar, which is frequently urged as a reason for not preserving, there are other objections to that method, and what I am about to mention cannot be considered as the least, namely, the great uncertainty of success, occasioned by the strong fermentable qualities contained in many sorts of fruit. It may be said by some, that fruit may be preserved for a length of time without sugar by the ordinary mode of baking or boiling, and being closely stopped up, to which assertion I freely assent; but even that method is frequently attended with uncertainty, for if the cork or other means used for keeping the external air out of the vessel becomes dry, or from any other cause the atmospheric air exchanges place with what is impregnated by the fruit, it soon becomes mouldy and unfit for use.

From these considerations, and a desire of preserving fruit at a trifling expense, I have made various and successful experiments of doing it without sugar, and at the same time with a certainty of their retaining all those agreeable flavors which they naturally possess; and it is highly probable that they will keep perfectly good for two or three years, or even a longer period, in any hot climate, by which it appears to become a valuable store for shipping or exportation, as I have exposed them to the action of the meridian sun in an upper room, during the whole of the summer, after they have been so preserved (being done in 1806). I have now the pleasure of laying before the Society specimens of the fruit alluded to.

Process for preserving Fruit.

The bottles I chiefly use for small fruit, such as gooseberries, currants, cherries, and raspberries, are selected from the widest necked of those used for wine, or porter, as they are procured at a much cheaper rate than what are generally called gooseberry bottles. Having got them properly cleaned, and the fruit ready picked, (which should not be too ripe,) fill such of them as you intend doing at one time, as full as they will hold, so as to admit the cork going in, frequently shaking the fruit down whilst filling. When done, fit the corks to each bottle, and stick them lightly in, so as to be easily taken out when the fruit is sufficiently scalded, which may be done either in a copper, or large kettle, or saucepan over the fire, first putting a coarse cloth of any sort at the bottom to prevent the heat of the fire from cracking the bottles: then fill the copper, or kettle, with cold water sufficiently high for the bottles to be nearly up to the top in it: put them in sideways to expel the air contained in the cavity under the bottom of the bottle; then light the fire if the copper is used, taking care that the bottles do not touch the bottom, or sides, which will endanger their bursting; and increase the heat gradually until it comes to about one hundred and sixty, or one hundred and seventy degrees, by a brewing thermometer, which generally requires about three quarters of an hour. For want of such an instrument it may be very well managed by judging of the degree of heat by the finger, which may be known by the water feeling very hot, but not so as to scald it. If the water should be too hot, a little cold may be added to keep it of a proper temperature, or the fire may be slackened. When it arrives at a sufficient degree of heat, it must be kept at the same for about half an hour longer, which will at all times be quite enough, as a longer time, or greater heat, will crack the fruit. During the time the bottles are increasing in heat, a tea-kettle full of water must be got ready to boil as soon as the fruit is sufficiently done. If one fire only is used, the kettle containing the bottles must be removed half off the fire, when it is at the full heat required, to make room for boiling the water in the tea-kettle. As soon as the fruit is properly scalded, and the water boiling, take the bottles out of the water one at a time, and fill them within an inch of the cork with the boiling water out of the tea-kettle. Cork them down immediately, doing it gently, but very tight, by squeezing the cork in, but you must not shake them by driving the cork, as that will endanger the bursting of the bottles with the hot water; when they are corked, lay them down on their side, as by that means the cork keeps swelled, and prevents the air escaping out: let them lay until cold, when they may be removed to any convenient place of keeping, always observing to let them lie on their side until wanted for use. During the first month, or two, after they are bottled, it will be necessary to turn the bottles a litle round, once for twice in a week, to prevent the fermentation that will arise on some fruits from forming into a crust, by which proper attention, the fruit will be kept moist with the water, and no mould will ever take place. It will also be proper to turn the bottles a little round once or twice in a month afterwards.

Having laid down the method of preserving fruit without sugar, in as clear and concise a manner as possible, I will recapitulate the whole in a few words, which may be easily remembered by any person. Fill the bottles quite full with fruit. Put the corks in loosely. Set them in a copper, or kettle of water. Increase the heat to scalding for about three quarters of an hour; when of a proper degree, keep at the same half an hour longer. Fill up with boiling water. Cork down tight. Lay them on their side until wanted for use.

It may be said as an additional reason as well as cheapness, for using wine, or porter bottles, instead of gooseberry, is the difficulty of obtaining them, even at any price, in some parts of the country, and indeed they are equally useful for small fruit, and answer the purpose quite as well, excepting the little inconvenience of getting the fruit out when wanted for use, which may be easily done by first pouring all the liquor out into a bason, or any other vessel, and then with a bit of bent wire, or small iron meat skewer, the fruit may be raked out. Some of the liquor first poured off, serves to put into the pies, tarts, or puddings, instead of water, as it is strongly impregnated with the virtues of the fruit, and the remainder may be boiled up with a little sugar, which makes a very rich and agreeable syrup.

In confirmation of the foregoing assertions, I now produce twenty-four bottles as samples, containing twelve different sorts of fruit, viz. apricots, rhubarb, gooseberries, currants, raspberries, cherries, plums, Orleans plums, egg plums, damsons, Siberian crabs*, and green-gages—which have all been preserved in the manner above described.

In order to diversify the degree of heat, and time of continuance over the fire, I have done some in one hundred and ninety degrees, and continued them in it for three quarters of an hour, from which experiments it is evident, that the heat is too powerful, and the time too long, as the fruit by that degree and continuance is rendered nearly to a pulp†. In the summer of 1807 I preserved ninety-five bottles of fruit, the expense of which, (exclusive of bottles and corks,) was 1l. 9s. 5½d.; but having some fruit left, it will not be right to judge them at a higher rate than 1l. 9s.; and allowing 5s. for the extra coals consumed in consequence of my not having a conveniency of doing more than seven or eight at a time, and this being done at fourteen different times, it will amount to 1l. 14s. the average cost of which is nearly 4½d. per bottle, exclusive of the trouble of attending them; but if we estimate their value in the winter season, at 1s. per bottle, that being in general as low or lower than the market price, they will produce 4l. 15s. but losing one bottle by accident, reduces it to 4l. 14s. leaving a net profit of 3l. on ninety-four bottles, being a clear gain of nearly two hundred per cent. Another great advantage resulting from this statement will appear by making it an article of store for shipping, or exportation; and I shall submit a few ideas tending to promote such a beneficial object by doing it in large quantities; for which purpose sufficiently extensive premises must be fitted up, with a proper number of shelves, one above another, at a distance of about five inches.

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* Apples and pears may be done for shipping, &c.

† Some of these samples of 1807, were done in 180 and 190 degrees.

The vessel for scalding the fruit in, should be a long wooden trough of six, eight, or ten feet in length, two or three in breadth, and one in depth, fitted with laths across to keep the bottles upright, and from falling against one another; this trough of water to have the heat communicated to it by steam, through a pipe from a closed boiler at a little distance. The boiling water wanted to fill the bottles with, may be conveyed through a pipe and cock over the trough, by which arrangement, many hundreds of bottles might be done in a short time. It may be prudent to observe that this idea is only speculative, not having been actually practised, but at the same time seem to carry with them a great probability of success, and worthy the experiment.

It remains now that I state some reason or object for troubling the Society, whom I have taken the liberty to address with these communications. The first is a desire of publicity, sanctioned by their investigation of the experiments made for preserving fruit without sugar, thereby lessening the expense attending an object of so much public benefit and utility. The second arises from a personal or private consideration; but on this subject I shall only observe, that I wish to throw myself entirely on that protection which has ever characterised the liberality of the Society; and that I shall feel highly honoured if they conceive what I have communicated deserving any mark of their favour.

I am, Gentlemen,

Your most obedient humble Servant,

THOMAS SADDINGTON.

Wood Street, London,
January 1, 1808.

To the Society of Arts, &c.